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Impact of pharmacist provided knowledge on dengue among selected school children

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ABSTRACT

Background: Dengue is a self-limiting acute mosquito transmitted disease caused by an arbovirus and spread by Aedes mosquitoes, sever infections results in DHF & DSS. Hence school education has been described as a 'social vaccine', and it can serve as a powerful preventive tool. Aim & Objectives: To assess the prevalence of mosquito borne diseases among School children, to assess the knowledge level of high school children regarding dengue and its prevention before and after the administration of planned teaching programme and to provide health education regarding dengue fever among school children. Materials and Methods: A six months' community based prospective observational study was conducted at selected schools of Gulbarga District. Total of 265 students were enrolled into the study by considering study criteria. Our inclusion criteria are all students of secondary school students of class 8th -10th. The data was collected from school children of RGEMS & AEMS in Gulbarga district. Results: In our study, most of the students were unaware of insect and species of mosquito which is responsible for causing DF, DHS & DSS and their knowledge was found to be excellent 3.6%, good 33.46%, average 37.90% and poor 25.00% before providing the knowledge. We pharmacist in our study played a vital role in providing education to the school children and their knowledge progress after our study was found, excellent 69.23%, good 30.76% and none of the students had average and poor knowledge. Conclusion: Our study concludes that the educational interventions by the pharmacist plays a vital role by educating the students and their by improving theirs and surrounding community health. Hence it is very imperative for pharmacists and other health care disciplinarians to carry out community based studies or educational interventions at all levels of students particularly in rural India where there is scope to improve their knowledge which helps students their parents and siblings and surrounding community.

Keywords: Aquatic plants; antimicrobial; tannins; phenolic compounds; alkaloids

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INTRODUCTION

Health has evolved over the century as a concept from individual concern to a worldwide social goal and encompasses the whole quality of life. Today health is recognized as a fundamental right of human being.[1]

The mosquito borne diseases cause more deaths than any other communicable diseases in India. Mosquitoes are important vectors in the transmission of viruses and parasites from animal to animal, animal to person, or person to person without affecting the insect's vectors with symptoms of diseases.[2]

Dengue fever is caused by a mosquito-borne human viral pathogen belonging to the genus Flavivirus of the family Flaviviridae (single-strand, non-segmented RNA viruses), transmitted in humans by two species of Aedes mosquitoes namely, Aedes aegypti (principal vector) and Aedes aldopictus.There are

four dengue serotypes (DEN-1, DEN-2, DEN-3, and DEN-4) disseminate disease in two main forms, dengue fever and dengue haemorrhagic fever (DHF).[3]

TYPES OF DENGUE FEVER

Infection with dengue virus can produce the clinical manifestations including sudden onset of high fever (103-106F), severe headache, backache, intensive pain in joints and muscles, retro-orbital pain for which it is known as "Break Bone fever".[4]

Classic dengue fever is characterized by the sudden onset of fever in older children and adults. A variety of nonspecific signs and symptoms, including severe headache, body aches, retro-orbital pain, nausea and vomiting, rash, joint pains and weakness. Clinical laboratory findings associated with dengue fever include a neutropenia followed by a lymphocytosis. Liver enzyme levels elevated in the serum; alanine aminotransferase and aspartate amino transferase levels reach 500 to 1000 U/litter in some patients suffering from dengue. 54% of confirmed patients with data reported on liver enzymes had elevated levels. Thrombocytopenia is also common in dengue fever. [5]

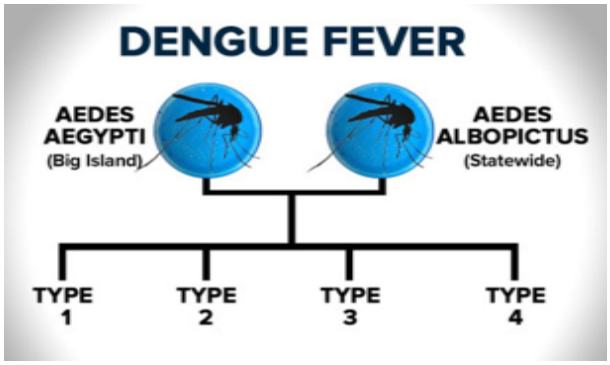


Figure 1: Types of Dengue Fever

If a person is infected with one serotype that person gets life- long immunity to that particular serotype and short-term immunity to others. The source of dengue is ambiguous, but the scientist has proposed that the dengue was originated in Asian forests due to an infection cycle involving between mosquito and primates. Mainly this mosquito bites during sun rising and sunset times. This virus transmits to one person to the other through human- mosquito- human transmission cycle.

When a person was infected with this virus he develops a condition called viremia (condition which there is a high level of virus developing in the blood) after four days. It can last from 5-12 days. The mosquito must take its blood meal from the infected person during the period of viremia where the high levels of virus in the blood by piercing the infected person4. Once the virus enters the mosquito's system through midgut and subsequently to the salivary glands within 8-12 days. After this incubation period the virus transmit to another person while feeding. The person develops the symptoms after the 5th day of the mosquito bite those include primarily High grade fever, headache, muscle and joint pains, and a distinguishing skin rash that is similar to measles. In a minute proportion of cases the disease expands into the life-threatening dengue haemorrhagic fever and finally leads to dengue shock syndrome, where dangerously low blood pressure occurs and leads to death particularly infants.[6]

The optimal temperature for Aedes aegypti larva is 280C. Above this the rate of development is high and below 180C the growth gets prolonged. Above 360C larval development is not complete. Extreme hot and dry weather may kill most of the eggs and render adult vectors inactive. Aedes aegypti population is high in rainy season and low in extreme hot weather. During rainy season the risk of virus transmission by the vector is greater. [7]

Dengue virus transmission follows two general patterns epidemic and hyper endemic transmission. Epidemic transmission occurs when dengue virus is introduced into a region as an isolated event that involves a single viral strain. If the number of vectors and vulnerable human hosts are adequate, explosive transmission can occur, with an incidence rate of 25-50%. Hyper endemic transmission is characterized by the continuous circulation of multiple viral serotypes in an area where a large pool of susceptible hosts and a competent vector (with or without seasonal variation) are persistently present and is the leading pattern of global transmission. Hyper endemic transmission appears to be a major risk for dengue haemorrhagic fever. [7] The first confirmed epidemic of dengue fever was recorded in the Philippines in 1953-1954. [3]

According to WHO, 50 million dengue infections occur worldwide with disease being more endemic in Africa, America, Eastern Mediterranean, South East Asia and Western Pacific regions2. During an epidemic of dengue infection almost 40% to 50% cases get exposed and this figure can reach as high as 80% to 90%. Globally almost 500,000 people with DHF require hospitalization each year with majority being children. Mortality occurs in 2.5% cases which can be reduced to 1% with easier access to medical care and having knowledge about dengue fever. [8]

Before 1970, only nine countries had experienced severe dengue epidemics. Today, the disease is endemic in more than 100 countries in African, Americas, Eastern Mediterranean, South-East Asia and the Western Pacific regions. The Americas, South-East Asia and Western Pacific regions are the most seriously affected where more than 1.2 million cases were reported in 2008 and over 2.3 million in 2010. In 2010, 1.6 million cases of dengue were reported in the Americas alone, of which 49000 cases were severe dengue. An outbreak of dengue on Madeira Islands of Portugal in 2012 resulted in over 2000 cases and imported cases were detected in 10 other countries in

Europe apart from mainland Portugal. An estimated 500000 people with severe dengue require hospitalization each year, a large proportion of whom are children. [9]

The global dengue pandemic has intensified during the past two decades until it now affects all continents except Antarctica. Dengue epidemics are increasing in frequency as well as in the severity of illness they produce. Over the past 20 years, there has been a dramatic increase in the incidence and geographical distribution of DHF, and epidemics now occur each year in some Southeast Asian countries. Dengue virus infection causes significant morbidity and mortality worldwide. Although it is initially believed that an infection mainly afflicted the paediatric age group, this infection has been rapidly spreading across all age groups. In Southeast Asia, epidemic DHF first appeared in the 1950s, but by 1975 it had become a frequent cause of hospitalization and death among children in many countries in that region.[10]

About 50–100 million cases of dengue fever and 500,000 cases of Dengue Haemorrhagic Fever (DHF), resulting in around 24,000 deaths, are reported annually (Porter et al, 2005; WHO, 1997). Over half of the world's population resides in areas potentially at risk for dengue transmission, making dengue one of the most important human viral disease transmitted by arthropod vectors in terms of morbidity and mortality. [11]

The global incidence of dengue has increased dramatically in recent decades; about half of the world's population is now at risk. Data available from National Vector Borne Disease Control Programme (NVBDCP) shows, dengue fever in India is on the way of rapid rise viz 5534 cases,2561 cases, 15335 cases,28292 cases and 18860 cases in 2007,2008,2009,2010 and in2011 respectively. [12]

Figure 2: *Aedes aegypti mosquito*

The rapid increase in human population, lack of awareness among people, environmental changes, social changes and increased breeding of vector mosquitoes resulted in increased dengue transmission. Water storage drums, criterns, flower vases, cement tanks, plastic and metal drums, tyres, bottles, tin cans, coconut shells and other such discarded containers which can hold rainwater, overhead tanks, ground water storage tank, etc. are the source of breeding of aedes mosquitoes. [13]

There is no specific medication or vaccine for its treatment. Therefore, WHO and CDCP recommend community educational campaigns that emphasize on reducing vector breeding sites as an effective way of dengue prevention. Avoiding mosquito bites is the effective way to prevent dengue fever and hence it is important to create awareness in the community regarding prevention of dengue especially in school and colleges. [4]

In the absence of a vaccine or specific antivirals to treat DF, vector control is one of the most important preventive measures in combating dengue. The recurrence of DF each year and the rising number of cases with each epidemic suggest that vector control efforts are probably ineffective and need to be improved. [14]

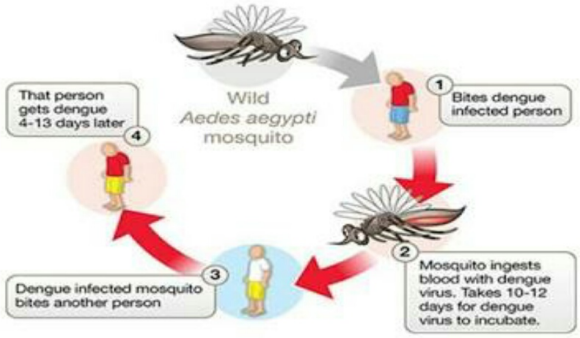


Figure 3: Mosquito-human transmision cycle

Dengue vector, human knowledge and human behaviour each have been reported to play an important role in the transmission of the diseases. Considering the magnitude of the problem the present study was undertaken to assess the knowledge & attitude of students regarding dengue and preventive practices undertaken by them and to determine the relationship of dengue fever prevention practices with level of knowledge & attitude. [15]

Dengue vector control requires effective participation of the local community. Although education campaigns have increased people's awareness of dengue, it remains unclear to what extent this knowledge is put into practice, and to what extent this practice actually reduces mosquito populations. [16]

Furthermore, this study describes the existing knowledge regarding dengue fever among school children, identify the current practices used by school children in their home environment to prevent dengue and identify the perceived barriers and available resources to prevent dengue. Findings of the study will be helpful to make strategies for students to enhance knowledge on dengue prevention in case of knowledge gap present. [17]

Several studies suggest that better knowledge of dengue and dengue vector prevention practices among people was one of the predictors of better practices of dengue prevention. [18]

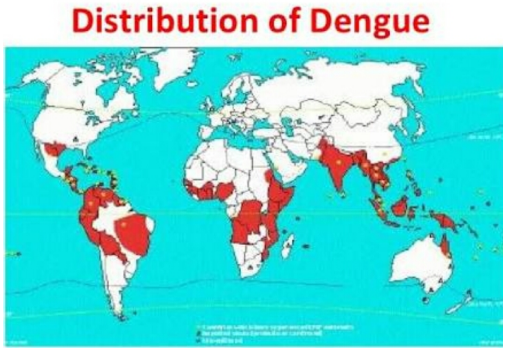


Figure 4: Distribution of Dengue in the world

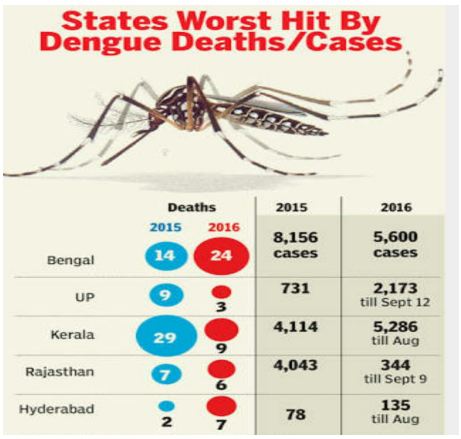


Figure 5: States worst hit by dengue deaths

METHODOLOGY

To assess the prevalence of mosquito borne diseases among School children, & the knowledge level regarding dengue and its prevention before and after the administration of planned teaching programme. & providing health education regarding dengue fever among school children.

PHASE – I: Identification of scope of work, Literature survey, Preparation of study protocol, Permission from the School authority, Approval from Institutional Review Board(IRB), Data collection (Structured knowledge Attitude Practice (KAP) of dengue fever), Collection of data from students.

PHASE – II: Analysis of the data, To assess existing knowledge Attitude Practice (KAP) of dengue fever among the school children with the help of structured questionnaires.

A Prospective observational study has been carried out, in RGEMS and AEMS schools of Gulbarga, for 06 Months from August 2016 to April 2017, with 265 students, the students from class 8th to 10th who are willing to participate are included in the study, Students who are not willing to participate are excluded from the study, the data was collected from school Children of RGEMS & AEMS schools of Gulbarga District by using Questionnaires.

RESULTS

Details of Students Enrolled: The study was carried out in two high schools as shown in table no-1. Total strength present at the time of enrolment was 265 out of which 202 students completed the study and 63 students did not turn up for the follow up. Out of 202 students who completed the study 83 (41.08%) and 119 (58.91%) were of Rajiv Gandhi English Medium School and Aryan English Medium School respectively.

Table 1: Details of Students Enrolled

School Name			Total
Code	RGEMS	AEMS	
No: of students enrolled	111	154	265
No: of students completed study	83	119	202
In (%)	41.08	58.91	100

RGEMS= Rajiv Gandhi English Medium School
AEMS= Aryan English Medium School

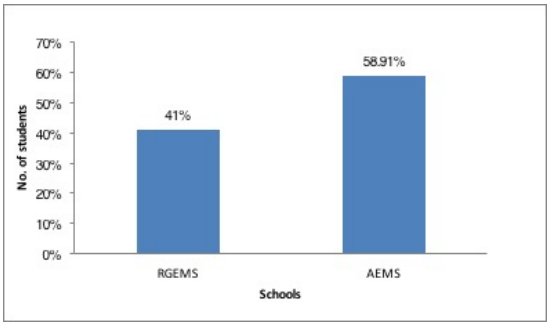


Figure 6: Bar Graph Showing Students Enrolled and Selected School Names

Details of Standard Wise Distribution: Out of 265 students 104 (39.24%) belonged to VIII standard, 80 (30.18%) belonged to IX and rest of the students i.e. 81 (30.56%) were from X standard.

Table 2: Standard Wise Distribution

Class	No. of students	Percentage (%)
Class VIII	104	39.24
Class IX	080	30.18
Class X	081	30.56
Total	265	100.00

Figure 7: Bar Graph Showing Standard Wise Distribution

Details of Gender wise distribution: Out of 265 students, 112 (42.26%) were girls and 153 (57.73%) were boys.

Table 3: Gender Wise Distribution

Gender	No of students	Percentage(%)
Girls	112	42.26
Boys	153	57.73
Total	265	100

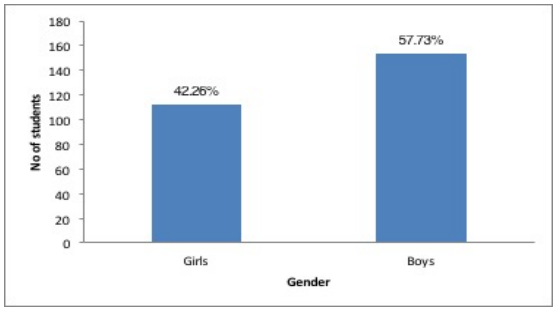


Figure 8: Gender Wise Distribution

Details of RGEMS Students Enrolled: Out of 111 students of Rajiv Gandhi English Medium School, 39 students were of VIII class, 34 students were of IX class and 38 students were of X class.

Table 4: RGEMS Students Enrolled

Sl.No	1	2	3
Standard	VIII	IX	X
No: of student enrolled	39	34	38
Baseline	34	32	33
Follow up 1	33	34	33
Follow up 2	39	34	33

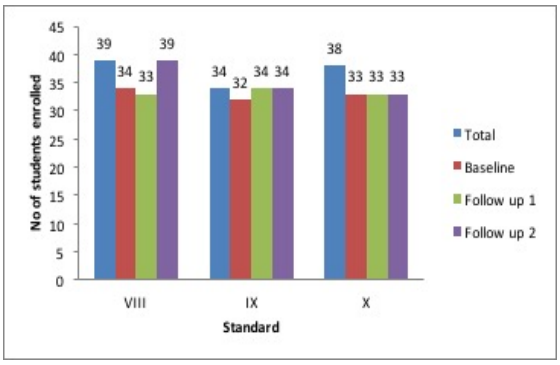


Figure 9: Bar Graph of RGEMS Students Enrolled

Details of AEMS Students Enrolled: Among 154 students of Aryan English Medium School, 65 students were of class VIII, 46 students were of IX class and 43 students were of X class.

Table 5: AEMS Students Enrolled

Sl.No	1	2	3
Standard	VIII	IX	X
No: of student enrolled	39	34	38
Baseline	34	32	33
Follow up 1	33	34	33
Follow up 2	39	34	33

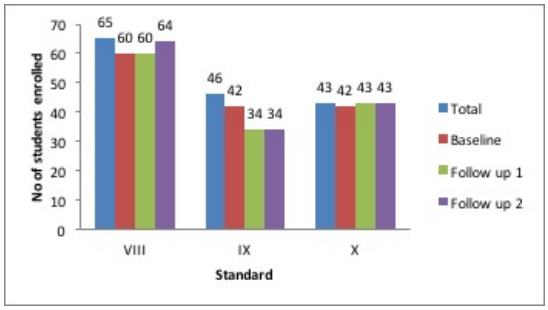


Figure 10: Bar Graph of AEMS Students Enrolled

Details of Comparative Assessment of Knowledge Mean Score of Dengue fever among Girls and Boys Students: Knowledge Mean Score of girls was found to be 45.30%, 65.17%, 80.60% in baseline, follow up 1 & 2 respectively.

Knowledge Mean Score of boys was found to be 39.78%, 56.39%, 77.44% in baseline, follow up 1 & 2 respectively.

Table 6: Mean Score of Dengue Fever Among Girls and Boys

Gender	Baseline (in %)	Follow up 1(in %)	Follow up 2 (in %)
Girls	45.30	65.17	80.60
Boys	39.78	56.39	77.44

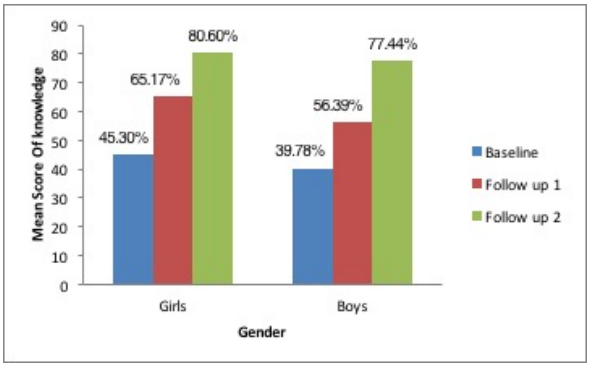


Figure 11: Bar Graph Details of Comparative Assessment of Knowledge Mean Score of Dengue Fever Among Girls and Boys Students

Details of Comparative Assessment of Knowledge Mean Score of Dengue Fever among Class Wise Students: Mean score knowledge of X standard in baseline, followup-1& 2 was found to be higher, followed by IX standard and VIII standard.

Table 7: Mean Score of Dengue Fever Among Class Wise

Class	Base line (in %)	Follow up 1(in %)	Follow up 2(in %)
VIII	38.82	58.07	76.71
IX	42.33	59.38	79.16
X	46.46	64.87	80.94

Details of Comparison of Knowledge Assessment of Baseline, Follow Up 1 & Follow Up 2 of High School Children on Dengue fever: In comparison of

overall mean score knowledge on dengue fever, average level of knowledge was higher in baseline, good level of knowledge was higher in followup-1 and excellent level of knowledge was higher in followup-2.

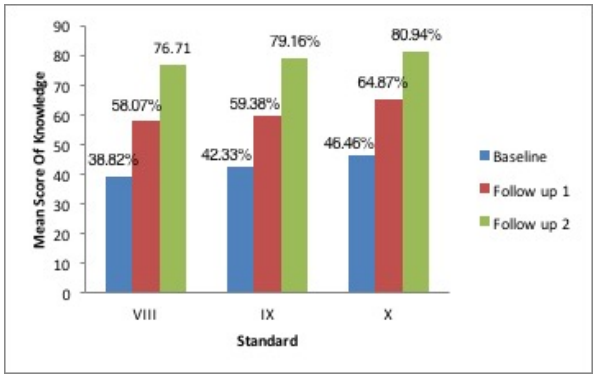


Figure 12: Bar Graph Details of Comparative Assessment Of Knowledge of Dengue Fever Among Class Wise Students

Table 8: Over All Mean Score of Dengue Fever

Level of knowledge	Criteria	Baseline (in %)	Follow up 1 (in %)	Follow up 2 (in %)
Excellent	>75 %	03.06	18.80	69.23
Good	50-74 %	33.46	63.71	30.76
Average	35-49 %	37.90	14.34	00.00
Poor	<35 %	25.00	3.37	00.00

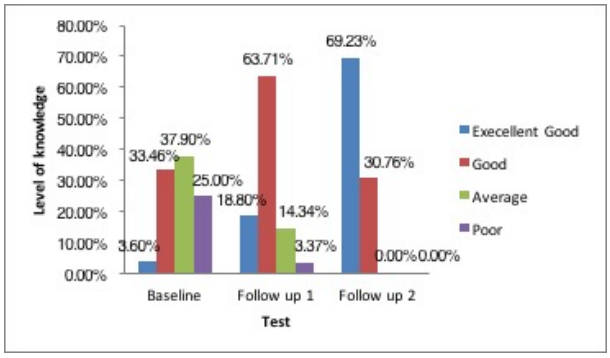


Figure 13: Bar Graph of Comparison of Baseline, Follow Up 1 & 2 Knowledge of High School Children on Dengue Fever

Comparison of Mean Score Knowledge of RGEMS & AEMS: Mean score knowledge of AEMS in base line, followup-1 & 2 was found to be higher than RGEMS.

Table 9: Mean Score knowledge of RGMES & AEMS

School	Baseline (in %)	Follow up 1 (in %)	Follow up 2 (in %)	Mean %
RGEMS	38.33	58.07	77.85	58.08
AEMS	46.74	63.47	80.21	63.47

Comparison of VIII Standard Means Score Knowledge of RGEMS & AEMS Students: The mean score knowledge in baseline, follow up-1 & 2 of VIII standard of AEMS was found to be higher than RGEMS.

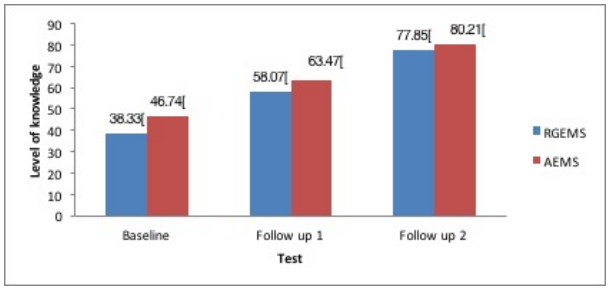
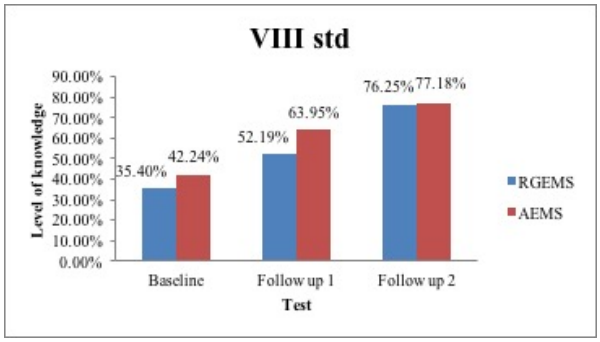


Figure 14: Bar graph Details of Comparative Assessment of Knowledge Mean Score of RGEMS & AEMS

Table 10: Mean Score knowledge of RGMES & AEMS

School	Class	Baseline(in %)	Follow up 1(in %)	Follow up 2 (in %)
RGEMS	VIII	35.40	52.19	76.25
AEMS	VIII	42.24	63.95	77.18



Comparison of IX Standard Means Score Knowledge of RGEMS & AEMS Students: The mean score knowledge in baseline, follow up-1 & 2 of IX standard of AEMS was found to be higher than RGEMS.

Table 11: Mean Scores knowledge of RGMES & AEMS

School	Class	Baseline(in %)	Follow up 1(in %)	Follow up 2(in %)
RGEMS	IX	40.54	56.59	73.33
AEMS	IX	44.12	62.18	85.53

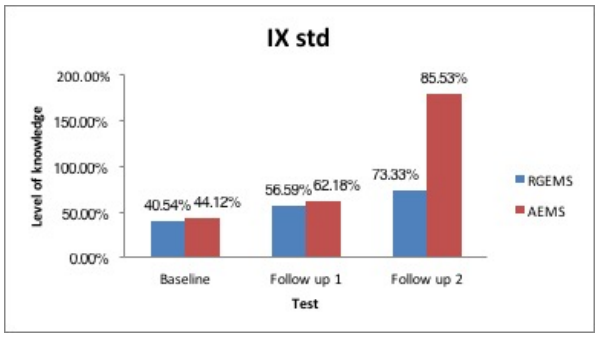


Figure 15: Mean Scores knowledge of RGMES & AEMS

Comparison of X Standard Means Score Knowledge of RGEMS & AEMS Students:

In comparison of X standard mean score knowledge of RGEMS & AEMS at the baseline, AEMS had a higher

mean score knowledge than RGEMS. During the followup-1, mean score knowledge was found to be slightly high in RGEMS than AEMS. During followup-2, mean score knowledge was found to be higher in RGEMS than AEMS.

Table 12: Mean Score knowledge of RGMES & AEMS

School	Class	Baseline (in %)	Follow up 1(in %)	Follow up 2(in %)
RGEMS	X	39.06	65.45	83.97
AEMS	X	53.87	64.30	77.92

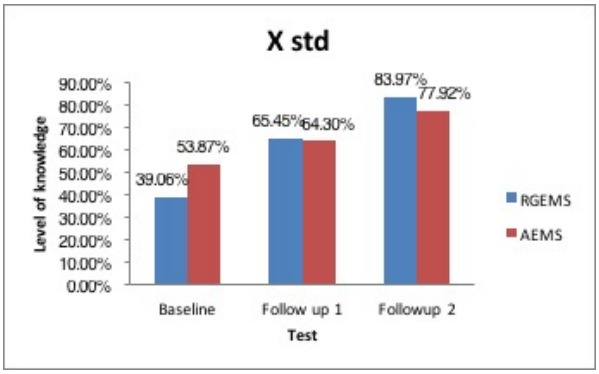


Figure 16: Bar Graph Showing Details Comparison of X Standard

DISCUSSION

Dengue is a severe Infectious and life threatening communicable disease which is a major health problem in the community. Dengue is a mosquito borne infection that causes a severe flu- like illness. Dengue is found in tropical and subtropical regions around the world. Unlike malaria, dengue is just as prevalent in the urban districts of its range as in rural areas. It is very essential to educate the school going children on some preventive measures like improving sanitation and avoid in mosquito bites and prevent reoccurrence of dengue fever.

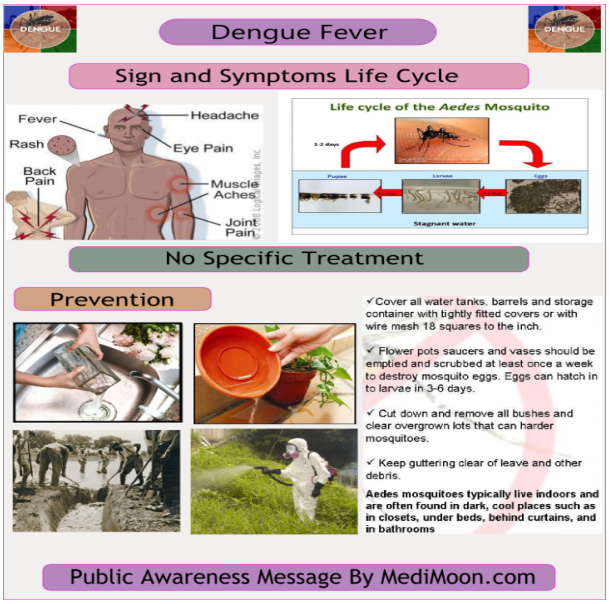


Figure 17: Signs and Symptoms of dengue fever

DF is typically known as a childhood disease and is an important cause of paediatric hospitalisation in Southeast Asia. However, in India, all age groups have been affected by DF.

In our study, total students participated were 265, among them 111 (41.88%) were from Rajiv Gandhi English medium school and 154 (58.12%) were from Aryan English medium school. In RGEMS out of 111 students 83 students and in AEMS school out of 154 students 119 students completed the study.

As per standard wise distribution VIII Standard represents 104 (39.24%), standard IX represents 80 (30.18%) and standard X represents 81 (30.56%).

In our study, out of 265 students 112 (42.26%) were girls whereas boys were 153 (57.74%).

In RGEMS of class VIII out of 39 students, 34 students were appeared in the baseline and in follow up – 1 and follow up – 2, 33 & 39 students were present respectively and from class IX out of 34 students, 32 were appeared in the baseline and 34 in each follow up-1 and follow up-2 were present, and from class X out of 38 students, 33 were present in the baseline and 33 and 34 students were present in the follow up -1 and 2 respectively.

In AEMS of class VIII out of 65 students, 60 students were appeared in the baseline and in follow up – 1 and follow up – 2, 60 & 64 students were present respectively and from class IX out of 46 students, 42 were appeared in the baseline and 34 in each were present in follow up-1 and follow up-2, and from class X out of 43 students, 42 were present in the baseline and 43 in each were present in follow up -1 and 2.

The mean score of dengue fever among girls in baseline was 45.30% and in followup-1 and followup-2 it was 65.17% and 80.60% respectively and among boys the mean score in baseline was 39.78% and in followup-1 and followup-2 it was 56.39% and 77.44% respectively.

In class VIII mean score of dengue fever in baseline was 38.82% and in the followup-1 and followup-2 it was 58.07% and 76.71% respectively, in class IX mean score of baseline was 42.33% and in the followup-1 and followup-2 it was 59.38% and 79.16% respectively, in class X mean score of baseline was 46.46% and in the followup-1 and followup-2 it was 64.87% and 80.94% respectively.

Our study showed that 03.6% of students have an excellent knowledge, 33.46% of students have good knowledge, 37.90% of students have average knowledge while 25.00% of students have poor knowledge about dengue fever in the baseline test.

After a structured information given to the students the knowledge level of the students on dengue fever has improved in the follow up-1 i.e. 18.80% of students showed excellent knowledge, 63.71% of students showed good level of knowledge, 14.34% of students showed average knowledge and 3.37% of

students showed poor knowledge. As compared to followup-1, 69.23% of students showed excellent knowledge and 30.76% of students showed good level of knowledge in the followup-2.

The mean score of knowledge between RGEMS & AEMS in baseline was 38.33% and 48.74% respectively, in followup-1 it was 58.07% and 63.47% respectively in RGEMS & AEMS and in the followup-2 it was 77.85% & 80.21% respectively in RGEMS & AEMS.

The mean score of knowledge between RGEMS & AEMS from class VIII in the baseline was 35.40% and 42.24% respectively, in followup-1 it was 52.19% and 63.95% respectively in RGEMS & AEMS and in the followup-2 it was 76.25% & 77.18% respectively in RGEMS & AEMS.

The mean score of knowledge between RGEMS & AEMS from class IX the baseline was 40.54% and 44.12% respectively, in followup-1 it was 56.59% and 62.18% respectively in RGEMS & AEMS and in the followup-2 it was 73.33% & 85.53% respectively in RGEMS & AEMS.

The mean score of knowledge between RGEMS & AEMS from class Xth baseline was39.06% and 53.87% respectively, in followup-1 it was 65.45% and 64.30% respectively in RGEMS & AEMS and in the followup-2 it was 83.97% & 77.92% respectively in RGEMS & AEMS.

Among 265 participants, 153 (57.3%) were boys and 112 (42.26%) were girls which is similar to the studies conducted by Laxmi Kumari P. et al6 their total participants include 500 students among them 256 (51.2%) were boys & 244 (48.8%) were girls.

Our study showed that excellent knowledge was found in 171 (69.23%) students, good knowledge in 76 (30.76%) students whereas none of the student had average and poor knowledge .The findings corroborates finding of the other studies done by Itrat Ahmed et al[20] that none of the student had excellent knowledge, 387 (87.95%) had average knowledge and 53(12.04%) had poor knowledge regarding dengue where as Kalra S et al[4] found that 6 (1.2%) had excellent knowledge, 199 (39.8%) had good knowledge, 290 (58%) had average knowledge and 5(1%) had poor knowledge.

Use of mosquito nets to prevent dengue is the most common practice, which may not be effective as mosquito nets are used at night whereas the dengue mosquitoes feed during day time. Use of mosquito repellent oils and ointments or sprays were also used commonly and are more effective as they can be applied on the body and the person can be ambulant.

CONCLUSION

We have found a low prevalence of sufficient knowledge in our sample population based on overall knowledge score on dengue. In this study students gained their knowledge on dengue fever from the information leaflets, audio and video resources which are provided by us during our interactions. Interventions by the pharmacist by means of structured education significantly helped to improve their knowledge regarding dengue and its preventive measures to the excellent level. Our study concludes that the educational intervention by the pharmacist plays a vital role by educating the students regarding the prevention of dengue for reducing the incidence of this deadly disease. The adolescents are fast learners and so they will imbibe the correct and appropriate perception and practice which they will readily percolate to their peer group, their elders, their neighbours and when they grow up to their family and progeny. Hence it is very imperative for pharmacists and other health care disciplinarians to carry out community based studies or educational interventions at all levels of students particularly in rural India where there is scope to improve their knowledge which helps students their parents and siblings and surrounding community. By this we also reach our goal Swach Bharath Abhiyan.

FUTURE OUTLOOK

A similar study may be replicated on a large scale which aims to increase awareness of prevention methods and equip children with the knowledge to tackle dengue.

School education has been described as a 'social vaccine', and it can serve as a powerful preventive tool.

Today's children are tomorrow's citizen. Hence, schools would seem ideal targets for any dengue education schemes, information reaches a large group of children, and stratification by age means that vector education can become more complex and in-depth as children mature.

There is no specific medication or vaccine for its treatment. Therefore, WHO and CDCP recommend community educational campaigns that emphasize on reducing vector breeding sites as an effective way of dengue prevention.

Avoiding mosquito bites is the effective way to prevent dengue fever and hence it is important to create awareness in the community regarding prevention of dengue especially in school and colleges. In the absence of a vaccine or specific antivirals to treat DF, vector control is one of the most important preventive measures in combating dengue.

Interventions by the pharmacist by means of structured education significantly helps to improve the knowledge regarding dengue and its prevention by using preventive measures like mosquito nets, mosquito repellents, mosquito coils, removal of stagnant water &by keeping the surroundings clean, to the excellent level.

The educational interventions by the pharmacist plays a vital role by educating the students and their

by improving theirs and surrounding community health.

CONFLICTS OF INTEREST

None

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